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Research on the Relationship between the Growth of OTT Service Market and the Change in the Structure of the Pay-TV Market

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ARTICLE INFO	ABSTRACT
<i>Keywords:</i> OTT Broadcasting industry Media Coopetition Catfish effect	Over-the-top media firms such as Netflix, Amazon Prime, and Hulu are transforming the coopetition relationship among media firms in the broadcasting market and the structure of the broadcasting industry. New entrants like OTT media firms kept using various coopetition strategies including mergers and acquisitions in order to gain a foothold in the firmly entrenched broadcasting industry. A few OTT media firms already successfully made inroads into the media industry and are expanding their turf in many countries, triggering drastic changes in the structure of the broadcasting industry. The entry of OTT firms has also been increasing tension with fixed and mobile broadband network operators worldwide and induced NOs to become OTT media firms themselves. In this paper, we propose an empirical study on the major countries with large broadcasting market size. This paper shows that OTT services in major countries having the huge TV market commonly use “localization strategy”, “partnership strategy”, “content differentiation strategy”, “revenue enhancement strategy”, and “service optimization strategy”. Add to these strategies, pay-TV incumbents use “envelopment strategy” and “diversification strategy” as well. In addition, OTT service revenues and fixed broadband subscriptions by major countries are set as independent variables, and the herfindahl-hirschman index of pay-TV market, which measures the market concentration, and the ratio of households subscribing to pay-TV services by major countries are set as dependent variables. Considering different characteristics of broadcasting market of each country, public funding, subscription revenue, advertising revenue, IPTV, satellite broadcasting platform, and cable broadcasting platform are set as dummy variables for applying the least square dummy variable analysis. As a result, it turns out that the increase in fixed broadband subscriptions has a statistically significant impact on the increase in the pay-TV market concentration and the cord-cutting phenomenon, but OTT service revenues do not affect.

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1. Introduction

This paper looks upon the emergence of “Over the Top (OTT)” as the most recent “disruptive innovation” following the digital era in the broadcasting industry. Unlike existing broadcasters, OTT operators are supplying various media contents to viewers by way of an on-demand basis employing open networks. International Telecommunication Union (ITU) defines OTT service as “a service or application which is provided to a user over the internet”.¹

The pay-TV market is the multisided market which consists of consumers (viewers), traditional pay-TV platforms (e.g. multiple system operators, satellite TV and IPTV operators), online distribution platforms (e.g. OTT services, video portals, mobile services), multimedia producers (e.g. terrestrial broadcasters, content producers, program providers), and advertisers and sponsors (e.g. advertising vendors, advertising agencies). Especially, the characteristics of this multi-faceted market have become more complicated due to the emergence and growth of online broadcasting platforms such as Netflix, Amazon Prime Video and Apple's Video.

In order to properly analyze the competition and entry strategy among the interest groups in the broadcasting market, it is necessary to view the intricate interests between them in a comprehensive and long-term perspective. The outline of the current situation is that online distribution platforms, which can be called emerging market players, are seeking to deprive the market hegemony of pay-TV platforms. However, both sides have the same matter that to provide free or charged contents and to earn service fees (or license fees for public broadcasters) and advertising fees. Accordingly, in the process of competition to increase the number of viewers and subscribers, sometimes broadcasting companies implement “zero rating pricing” in which a mobile operator pays data fees for viewers watching some specific contents. Other strategies include cutting rates, combining sales with other services, providing differentiated services, and increasing switching costs.

In the case of TiVo, it is necessary to cooperate appropriately with existing suppliers in order to successfully settle in the market if OTT operators are in an offensive position (Ansari

¹ Global Partners Digital. (n.d.). *OVER THE TOP (OTT) SERVICES*. Retrieved from <https://www.gp-digital.org/wp-content/uploads/2017/12/itu-ott-2.pdf>

et al., 2016). OTT firms threaten broadcasters' traditional profit model in which advertisement revenues account for the largest share by making to skip advertising possible. On the other hand, private broadcasters face the decrease of the percentage of advertising income (Hoelck & Ballon, 2016).

The entry of OTT firms has also been increasing tension with fixed and mobile broadband NOs and induced NOs to become OTT media firms themselves. It would not be possible for OTT media firms to make inroads into the entrenched media industry without broadband networks. The tension between OTT firms and broadband network operators are ever increasing, as manifested by net neutrality debates and policies. Thus this paper questions what kinds of strategies are being adopted by the new entrants and the incumbents in the reality by examining several key advanced countries in terms of TV revenue.

The passage of the Telecommunications Act of 1996 in the U.S. showed us well how a sudden change of institutional factor could affect the whole structure of the broadcasting market. The act specified about deregulation allowing the cross-ownership between telephone and cable operators. After the passage, a host of mergers and acquisitions occurred following the merger of US West and Continental Cablevision Inc. This merger case happened with the both sides' expectations for: revenue diversity, market power of programming, and the integration of video, voice, and data communications (Tseng & Litman, 1998).

Tseng & Litman (1998) judged that the purpose of merger is to fulfill economic efficiencies resulted from "economies of scale and scope, synergies, horizontal and vertical integration, and market power", and that M&A takes a role to tear down the entry barriers of distinct markets and to form an integrated multimedia industry eventually. The authors identified the passage of the act catalyzed the increase of CR4, CR8, and HHI in the MSO market by comparing those in 1995 with those in 1996. In other words, they measured the change of market structure and post-merger effect via checking those indices. However, they did not identify further figures in the long term after 1996. Chan-Olmsted (1998), meanwhile, pointed out that M&A, the ultimate form of strategic alliance, could enable telecommunications and media firms to consolidate different segments quickly, secure a developed customer base, integrate smaller niches, and expedite the implementation of new technologies. Consequently, the author identified that the numbers of M&A transactions (TV, cable, and telephone transactions) valued at more than \$5 million in the U.S. in 1996 had

been increased year-on-year, but did not make an attempt to implement long-term investigation as well.

Besides the passage of the act in 1996, what could be considered as a recent factor bringing about the drastic change of the structure of the broadcasting market? Evens and Donders (2016) argued that recent broadcasting industry is being transformed owing to the increase of rivalry between Internet and OTT streaming platforms largely, and that it is a detriment to weaken cable's gatekeeper position in the market. They concluded pay-TV operators pursue M&A so as to fulfill economies of scale bringing them more negotiation power on broadcasters and content producers (Evens and Donders, 2013). However, they did not take a quantitative approach but a qualitative approach. In their analysis, they remarked a normative statement stressing the importance of role of policymakers to make a "level-playing field", in which M&A is unconstrained and special treatment to affiliations is not allowed, so that relatively small OTT firms could find the ways to survive in competition with bigger rivals.

Although there have been some debates on what is the proper criterion of category establishment for measuring concentration of media ownership (measuring large or small media segments), many quantitative research tried to analyze media ownership by calculating or examining the trend of CR4, CR8, and HHI in the market. Albarran and Dimmick (1996) asserted the concentration indices in the whole communication industries not that high even if the indices are high in some specific segments after examining the market in 1994. Compaine and Gomery (2000) compared ownership concentration in 1986, the year after the Federal Communications Commission (FCC) had lowered the height of barriers hindering ownership of broadcast properties, with the concentration in 1997, the year after the passage of the Telecommunications Act of 1996, and they drew a similar conclusion to Albarran and Dimmick's assertion that the media market is one of the competitive markets in the U.S.. Unlike those previous research, Noam (2016) adopted a research method measuring country-by-country concentration indices and dealt with a vast field of media segments including print, audiovisual, telecommunications, and internet media, but the employed indices were not consecutive annual data but somewhat sparse and irregular. Winseck (2018) also covered market concentration indices in widespread segments but looked into Canadian market instead of global scale market. Vizcarrondo (2013) also looked into the U.S. market and drew a similar conclusion that the media industry has been generally competitive during the

research period (1976-2009). The author added the concentration of media industry showed three phases: 1) declining concentration (1976-1987), 2) consistent concentration (1988-2000), and 3) increasing concentration (2001-2009).

Taken altogether, those previous literatures shed light on to know what have been shocks to affect the structure of broadcasting market and how we could measure changes arising from the shocks. However, early works have a tendency to focus on a few specific points without examining consecutive annual data. Later works look into more precise annual data generally but it is not common to find works covering country-by-country data. Some works cover those but they are generally lack of consecutive annual data up to recently.

Thus this paper questions whether the revenue growth of OTT firms and fixed broadband, indispensable network resource to deliver contents, in each country increased market concentration and cord-cutting or not.

2. Empirical Analysis on the Strategies of Media Firms

2.1. US

The US broadcasting market has about 200 companies, largely divided into satellite broadcasting, cable, and IPTV-based companies. The company with the largest number of subscribers is Comcast Corporation, a cable-based company, having approximately 21.2 million subscribers as of the end of March 2018, and it is followed by satellite-based DirecTV having 20.27 million subscribers and Charter Spectrum having 16.42 million subscribers. Their subscriber trends showed a sharp uptrend until 2010, but the growth is stalling from the first quarter of 2010, when OTT market grew rapidly.

The U.S. broadcast market has undergone a drastic structural change in recent years. OTT services such as Netflix and Amazon Prime Video have increased rapidly, and it has led to customer turnover to multi-channel providers. As of 2017, Netflix surpassed 50 million subscribers in the U.S. for the first time, surpassing total sum of subscribers of Comcast and DirecTV, both of which had been former strong companies in the pay-TV market. The subscribers of Netflix have exceeded 57.38 million by 2018. While the number of subscribers

to major cable providers has been declining for the same period. In the U.S., there is a single cable operator in each state usually, and there are some areas where the optical fiber cable is not buried. Even allowing for these weaknesses, the truth that the number of Netflix's subscribers is over than the total sum of the companies seems to be evidence that the paradigm of the US broadcasting market is changing.

The number of cord-cutters switching from pay-TV to Internet broadcasting is 16.7 million in 2016, and it is expected that the number will exceed 40 million in 2021.² The number of viewers who have never subscribed to pay-TV and only used online platform from the beginning has shown even greater variation, reaching 32 million in 2016, and it is expected to reach 41 million in 2021. Component ratios of cord-never users by age in 2018 are: 24% of the age group 18-34, 15% of the age group 35-44, 12% of the 45-54 age group, 8% of the 55-64 age group, , 9% in the age group of 65 years or older. The ratios are especially higher in the younger group, but it is also active in other age groups as well. The fundamental reason for this shift of paradigm is the price burden of TV subscription. About 70% of cord cutters in the US stated this reason for switching. In fact, half of North American consumers pay \$ 6 to \$ 11 per month for joining OTT services such as Netflix or Hulu, which is less than half of the paid subscription fee (\$ 23.79).

OTT service companies are also increasing every year in line with changing broadcasting trends. In 2008, only five companies launched new services, but the number surged to 32 in 2015. In comparison with home video market revenue, OTT streaming services' revenue was slightly ahead in 2010, but the OTT figure was more than double of that of home video market in 2015. As the market continues to grow, competition among OTT companies is expected to become even more intense.

As of 2018, about 170 million Americans are using OTT services, more than 40 companies offer OTT services to meet changing consumer needs. The number of competitors has increased, but the market structure has become more concentrated. Netflix is taking most of its market share with 40% by the standard of watching time followed by You Tube (18%), Hulu (14%), and Amazon (7%).

There are three main strategies of Netflix in the U.S. market. The first one is "content

² Statista. (2018). *Number of non-pay TV viewers in the United States from 2016 to 2021, by type*. Retrieved from <https://www.statista.com/statistics/782549/number-non-pay-tv-viewers-cord-cut-never-usa/>

differentiation strategy”. In the early days, Netflix played a role as a content distribution channel. However, as Netflix had gradually increased its share of the market and threatened the existing broadcasting companies, it became difficult to receive contents from existing content providers. Existing content producers required unreasonable down payment, and some companies even canceled the contract. Netflix began developing its own contents and invested more than \$ 7 billion in 2018 to break through its limitations as a simple content distribution channel. This full-fledged investment earned it the honor of being the sole number one at the Emmy Awards held in September 2018.

The second strategy of Netflix is “service optimization strategy”. Netflix has avoided the traditional TV watching culture in homes. It has enabled customers to watch contents freely through smartphones or various devices without hassle of caring about space, time, and amount of money by adopting a flat rate per month system. Unlike Hulu, in addition, it restricted advertisements.

The third strategy is “partnership strategy”. Netflix tries to maintain productive relationships with Internet Service Providers and hardware-based companies such as DVD player sales companies and laptop sales companies.

In a new and changing situation, traditional pay-TV broadcasters adapt to the market through different strategies while facing Netflix and other OTT operators.

The first strategy is “revenue enhancement strategy”. Cable services are usually provided to consumers through bundling. Some of the channels in the bundling are low-cost channels with fewer preferred viewers, while some programs such as sport channels are expensive. Consumers usually choose one or some bundling options to suit their taste.

The second strategy is “partnership strategy”. Some cable operators use Netflix and other OTT supply chains that do not have live services as single distribution channels. SKY, which lost many subscribers, is a typical case, and various cable channels such as Discovery channel and OSN are affiliated with Netflix so that they could distribute their contents through the supply chain. Alliance could be established between a pay-TV broadcaster and a contents provider. The acquisition of Time Warner by AT&T was a representative example for heading off OTT services.

The third strategy is “envelopment strategy”. Terrestrial TV broadcasting service suppliers plunged into the changing paradigm early. In March 2008, terrestrial broadcasters started

OTT service called Hulu. In the early period, unlike Netflix, Hulu inserted advertisements between contents for attracting a large number of subscribers without charging subscription fees (the free service ended in August 2016). In addition, Hulu is a streaming service based on terrestrial contents. With this strength, it started live broadcasting service as well since 2017.

Another Strategy is “service optimization strategy”. Cables make efforts to change themselves by making UX and UI better in order to strengthen competitiveness related to launched OTT service.

2.2. UK

Like other major nations’ market, the UK broadcasting market was not able to avoid the dreadful whirlwind called cord cutting. In 2016, average daily TV viewing time for UK adult viewers was 3 hours 51 minutes, down 36 minutes from 2010. Adult viewers in the UK preferred to BBC iPlayer, one of the nonlinear broadcasting platforms, as a TV program and movie viewing service path. The second preferred route was itv. In addition, overseas OTT service providers such as YouTube, Netflix, and Amazon have become more prominent.³

Among the various OTT service paths, BBC iPlayer, Sky, Netflix, and Amazon Prime Video account for large shares in the market. For Netflix and Amazon, which are also well-known companies and rivals of foreign-based SVOD service providers, Netflix in the UK was higher in terms of the number of subscribers than that of Amazon. The number of subscribers to the two companies in the UK has increased for three consecutive years, and the number of Netflix subscribers in 2016 has increased by 17% to about 6 million year on year. The number of Amazon Prime subscribers in 2016 was about 3.8 million, more than doubling from the previous year. Compared with 2015 and 2016, the percentage of viewers who use both pay TV and OTT services remained almost unchanged from 75% to 74%. This is due to the fact that the UK TV market has been growing centered on the public broadcasters including BBC and there is a satisfactory non-linear public broadcasting service like BBC iPlayer. In other words, it can be seen that OTT service plays a supplementary role in the UK

³ Ofcom (2017). *Communications Market Report UK 2017* (Figure 2.2). Retrieved from https://www.ofcom.org.uk/__data/assets/pdf_file/0017/105074/cmr-2017-uk.pdf

market rather than a substitute for pay TV.

The total online audio visual revenue of UK in 2016 was about £ 1.65 billion, up 23% from the previous year, and the compound annual growth rate between 2011 and 2016 recorded 45%. In 2016, the revenue of ad-funded video platforms (YouTube, the ITV Hub, All4, My5, etc.) reached to £ 700 million, up 15% from the previous year. OTT operators (Netflix, Amazon Prime Video, etc.) were the second largest contributors to the subscription revenue of £ 664 million. In other words, in the UK OTT market, ad-funded video service providers still dominate.⁴

This diversification of the UK market is due to the rapid changes in the broadcasting market environment. In the past, people had no choice but to watch TV via TV receivers, but with the development of ICT, TV programs and movies can now be enjoyed anytime, anywhere via desktops, laptops, tablet PCs. As a result, large multinational video service companies such as Netflix, YouTube, and Amazon could be born. Netflix and Amazon had more than 8 million subscribers and more than 4 million subscribers respectively in 2018, and YouTube, which is capable of uploading videos and providing relatively short videos for free, had more than 40 million monthly users. Facebook and Apple are also major players in the UK OTT market. In addition, the development of high definition streaming technology such as 4G mobile technology has helped to increase the number of non-linear programs and to realization of ubiquitous TV viewing by increasing playback and downloading speed.

In the early 1960s, the press used the term “British Invasion” for describing the soaring popularity of the Beatles in the U.S. Looking at the UK TV market nowadays, it would be appropriate to use the term “American Invasion” because the strength of OTT providers from the U.S. is significant. One of the reasons for this phenomenon is that US OTT operators have a large content budget, just like the Hollywood moviemakers. In 2017, for example, Netflix's content budget (for original content production costs, co-content production costs, and copyright purchasing costs) reached to \$ 8.9 billion, more than the UK total content budget of £ 2.6 billion. Of these, £ 1.3 billion is the budget of BBC. US OTT operators, with overwhelming budgets, are producing quality content with the benefit of economies of scale, and the contents function to raise the price of premium dramas sometimes.

⁴ Ofcom (2017). *Communications Market Report UK 2017* (Figure 2.13). Retrieved from https://www.ofcom.org.uk/__data/assets/pdf_file/0017/105074/cmr-2017-uk.pdf

Another change in the broadcasting market is the activation of M&A. For example, an American giant content producer 21st Century Fox acquired Sky, and a global media group Viacom acquired a private British terrestrial channel Channel 5.

Amazon entered the UK and Ireland through the acquisition of LoveFilm in 2011, and Netflix entered the two countries in 2012. After the inroad, Amazon launched a platform called Amazon Prime, and Netflix began to penetrate the market with a surprisingly low price of £ 5.99 per month. In terms of content, Netflix also contracted exclusive distribution agreements with leading producers such as Miramax films, Lionsgate UK, and MGM to begin offering high-quality contents centered on Hollywood contents.

Amazon began closing its acquired LoveFilm's streaming and disc delivery services in 2014 and focused on Amazon Video services. It also raised Amazon Prime's annual membership fee from \$ 79 to \$ 99. In 2015, it partnered with other paid broadcasters to launch Amazon Channels, a streaming partner program that enables Amazon Prime subscribers to access third-party networks such as HBO and CBS with their Amazon account. In 2018, Amazon bought the right to broadcast 20 games of the English Premier League in order to differentiate its contents.

Netflix has partnered with carriers to apply a strategy that allows viewers to naturally experience Netflix through third-party set-top boxes. In 2014, Netflix concluded an alliance to provide Netflix services to set-top boxes of UK carriers BT and TalkTalk. It also raised the basic monthly fee from \$ 7.99 to \$ 9.99 for the year. In 2016, they launched the original UK content "The Crown", and in 2018, they partnered with Sky to enable Sky subscribers to access Netflix via the Sky Q platform. In the same year, they agreed to establish a new content distribution alliance with a mobile network operator O2.

Terrestrial public broadcasters and pay-TV broadcasters have responded as domestic and international OTT operators have become more aggressive. When Amazon and Netflix entered the market, Sky TV launched its streaming service NowTV in 2012. In April 2016, the BBC merged BBC Worldwide, a subsidiary in charge of content distribution and in-house production, to form BBC Studios. This was to increase the scale in response to the increasingly fierce broadcasting market environment in terms of production, sales, and distribution. In addition, BBC signed a "Cultural Creative Industries Trade Deal" with Tencent for content co-production and development, and formed an alliance with BritBox for

responding to the growing demand for VOD services of BBC iPlayer. There are currently discussions on building a similar platform to YouTube among the major UK players: BBC, ITV, and Channel 4.

Table 1

Strategies of major OTT firms in the UK market.

	Netflix	Amazon	NowTV
2011		△ Enter the Irish broadcasting market through the acquisition of LoveFilm,	
2012	△ Entry into the Irish market - Set the monthly fee to £ 5.99 △ Supply Hollywood contents primarily through exclusive dealership agreement with MGM, Miramax Films, Lionsgate UK	△ Launched Amazon Prime platform in UK	△ Established NowTV - Subsidiary of Sky, a major player in the UK pay-TV market - Service Internet TV, broadband, fixed telephone △ Launches Sky Cinema and Sky TV in response to Amazon and Netflix
2013			△ Launch Sky Sports channel △ Launch entertainment channel
2014	△ Alliance with BT and TalkTalk to provide Netflix service to UK settop boxes △ Raise the basic monthly rate from \$ 7.99 to \$ 9.99	△ End LoveFilm streaming and disc. delivery service. Start Amazon Video Services △ Raise Amazon Prime annual membership fee from \$ 79 to \$ 99	
2015		△ Launched Amazon Channels, a streaming partner program that enables Amazon Prime subscribers to access third-party networks such as HBO and CBS with Amazon account	
2016	△ Start streaming UK original content "The Crown"		△ Start broadband service in UK
2017			△ Start Internet TV service in Ireland

- 2018 △ Alliance between Sky TV-
Netflix for selling combined
products
- Sky subscribers can access
Netflix service via Sky Q
platform
- △ Content distribution
alliance between Netflix-O2,
mobile network operator
-

2.3. *France*

The French OTT market continued to grow for four years from 2013 to 2016. In 2016, the OTT market revenue exceeded the double of 2013 revenue. If the OTT service is classified according to the charging method, it can be divided into TVOD (Transactional Video on Demand) and SVOD (Subscription Video on Demand). In 2013, TVOD revenue far outstripped SVOD revenue, but in 2016, SVOD revenue surpassed TVOD revenue. It seems to be not irrelevant to the fact that Netflix, which leads the French OTT market, is offering SVOD services.

Netflix was the most used paid VOD platform in France in 2017. It is noteworthy that the company achieved the top usage rate in only three years after entering the French market. Orange, a mobile telecom operator, ranked second, and VOD services of top three terrestrial broadcasters ranked third to fifth. In order to combat Netflix's hegemony, three French television companies, France Television, TF1, and M6 announced a plan to launch a joint streaming platform called "Salto" in 2018.

Looking at the viewership in France from the second half of 2012 to the first half of 2015, the proportion of households receiving digital terrestrial broadcasting in 2015 decreased by 1.9% p from 2012. On the other hand, the proportion of TV households watching TV via the Internet increased by 7.7% p in 2015 compared to 2012. This shows that French viewers are increasingly interested in watching non-linear broadcasting. However, the proportion of households receiving satellite and cable TV in 2015 was almost unchanged compared to 2012. The rate of households watching TV over the Internet was the second highest. However, the current trend suggests that there is a possibility the Internet could become the most popular means of watching TV in the future.

France is a member of the European Union and is subject to the Audiovisual Media Services Directive (AVMSD). The EU AVMSD amendment enforces the Country of Origin Principle for TV broadcasters and VOD service providers. The principle of origin denotes that, if a supplier in an EU Member State sells goods or services to another Member State, it is subject to the laws of the country

of the seller. That also specifies the extended application of AVMSD on video sharing and social media platforms, and introduces a requirement that the composition of European contents in the VOD providers' library should exceed 30%.

The enforcement decree of the Ministry of Culture and Communication of France, in addition, stipulates not only holdback regulations but also production investment obligations for films and video works. It states that the production investment for the work (2-26% of the previous year's profit depending on the type of broadcaster) should be implemented by media service operators mandatorily. However, if the video platform corporation like Netflix is out of France, it would be impossible to impose tax, so it has caused equity problems with domestic companies in France. Thus it was amended that overseas platforms such as YouTube, Amazon, Netflix, and Apple iTunes, which make profits in France, also began to pay 2% of their preceding year's profit.

Although the AVMSD amendment stipulates that the European content composition ratio in the VOD provider's library should exceed 30%, France has already implemented a quota system that is stricter than the amendment for VOD operators in its own country. The library of French VOD providers should have a proportion of European productions of more than 60% and a proportion of French-speaking productions of more than 40%. However, if a video platform corporation is overseas such as Netflix (located in Amsterdam, Netherlands), it would be impossible to apply a quota system. When the revised AVMSD is in effect, overseas platforms should also have more than 30% of European productions.

This paper argues that there are five major categories of OTT operators' strategies in France: "localization strategy", "partnership strategy", "content differentiation strategy", "revenue enhancement strategy", and "service optimization strategy".

The localization strategy refers to OTT operators' creating and distributing original contents in French to increase the number of paid subscribers in France. In 2016, Netflix broadcasted its first French television series "Marseille", and in the same year, Amazon Video made its debut with "The Neon Demon", co-produced by Gaumont in France, and "Paterson", co-produced with Le Pacte. In 2018, Netflix announced a plan to produce a documentary about the Paris terror called "November 13: Fluctuat Nec Mergitur". As a part of the localization strategy, the AVMSD amendment mandates that the European content composition ratio in the VOD providers' library should exceed 30%, and the localization strategy will continue to be strengthened considering both revenue and regulatory aspects.

The alliance strategy refers to alliances of several operators in the multi-sided market for OTT

operators to obtain service distribution channels and contents. In 2014, for example, Netflix partnered with French mobile operators (Bouygues Telecom, SFR, and Orange) to provide VOD services through their IPTVs. A Japanese OTT operator Rakuten established a partnership with Samsung Electronics to supply VOD services to Samsung Smart TV in France in 2017. In 2018, Amazon Prime Video and TF1 Droits Audiovisuels signed a partnership for distributing French TV series and movies.

The content differentiation strategy refers to strengthening so-called killer contents, which have a high marketability that other platforms do not have and leading to increase the number of subscribers. OTT original contents and Hollywood blockbuster movies, which have already proven to be marketable outside of France are examples: Netflix's "House of Cards", "Dare Devil", "Jessica Jones", and "Narcost"; Amazon's "Jungle Mozart" and "Transparent"; HBO's "Game of the Throne".

Revenue enhancement strategy can be defined as measures to adjust service prices, enhance service capabilities, and change the distribution structure in order to increase profits. When Netflix entered the French market in 2014, it implemented relatively low pricing (7.99 euros for basic type) to increase the number of subscribers. In 2015, the next year, the number of service programs increased from 3,598 to 10,858 as an effort to attract more subscribers, while raising the standard monthly rate from € 8.99 to € 9.99. If the price hike is not owing to price index or production cost increase, it can be seen that firms adopt a pricing strategy by aiming subscribers having low price elasticity of demand. In 2017, meanwhile, Netflix released "Okja", which is an original film produced by the company itself and chosen at the Cannes Film Festival competition, and was supplied to VOD service and some movie theaters in France. It gave rise to controversy over holdback regulations since if it had not been for the original movie, it would have been supplied in Netflix 36 months later after cinemas' release. Skipping the 36-months-long distribution stages makes OTT services profit from the demand for movies quickly and for a long time. Thus it could be looked upon as a revenue enhancement strategy.

The service optimization strategy can be thought of as maximizing the utility of the user by improving the service function continuously. For instance, Netflix introduced curation feature on contents and recommendation algorithm function after analyzing subscribers' content watching patterns and tastes.

Comparing to the OTT operators' strategies, this paper diagnoses existing mainstream operators also use "partnership strategy", "content differentiation strategy", "revenue enhancement strategy", "service optimization strategy", and using "envelopment strategy" and "business diversification

strategy” additionally.

Table 2

Strategies of major broadcasting firms in the French market.

	OTT firms	Major existing firms
2014	<p>△ Netflix launched a SVOD service in France. Basic monthly rate set at 7.99 euros</p> <p>△ Netflix partnered with IPTV service providers: Bouygues Telecom, SFR, and Orange</p> <p>△ Japanese VOD service Rakuten TV Entered the France market</p>	<p>△ Canal + launched SVOD service CanalPlay. Monthly price down from 9.99 euros to 7.99 euros</p> <p>△ Oranecast SVOD service became available through TV connection dongle</p>
2015	<p>△ Netflix expanded offering programs from 3,598 to 10,848 in France</p> <p>△ Netflix France raised the fee of standard type (with HD support and 2 simultaneous connections) from 8.99 euros to 9.99 euros</p>	<p>△ Mobile operator Numericable-SFR purchased the right to broadcast UK Premier League soccer games</p> <p>△ TF1 launched XTRA, a web-based video service that mainly supplies overseas series and classical programs</p> <p>△ TF1 launched OTT platform eCinema label enabling to view latest movies in HD and 5.1 sound</p> <p>△ Canal +’s parent company Vivendi established Studio +, a mobile mini-series production and distributor</p> <p>△ Introduced content recommendation algorithm to Canal + and CanalPlay</p>
2016	<p>△ Netflix launched the first self-produced French TV series “Marseille”</p> <p>△ Amazon Prime Video entered the French OTT market</p>	<p>△ Canal + supplied myCANAL to Samsung Smart TV</p>
2017	<p>△ Netflix original movie “Okja” was released and invited to competition in Cannes, France</p>	<p>△ Orange S.A.’s OTT service OCS Go signed exclusive supply contracts with Warner Bros, HBO, MGM, and Fidelity</p>
2018	<p>△ Netflix announced documentary production on Paris terror in November 2015</p>	<p>△ TF1, M6 Groupe, and France Televisions announced a plan to jointly establish an OTT platform “Salto”</p>

2.4. Germany

The German OTT service market grew steadily for four years from 2013 to 2016, and the revenue of OTT market in 2016 grew 2.43 times from 2013. It can be seen that the size of the SVOD market was getting bigger when classifying the OTT service market into the SVOD and TVOD market in line with type. In 2013, total TVOD revenue was 5.43 times greater

than that of SVOD, but in 2016, TVOD revenue was 1.19 times larger than that of SVOD. In France, SVOD revenue surpassed TVOD revenue in 2016, and in the case of Germany, SVOD market is likely to be larger than TVOD market in the future.

Like other countries, the cord cutting phenomenon indicating that viewers watch non-linear programs more than linear programs preferentially is occurring, and the size of the OTT service market is also growing. Unlike other countries, German viewers are more likely to prefer Amazon to Netflix because Amazon entered the German market earlier and has been enjoying the advantage of preemption. In the third quarter of 2017, Amazon ranked the top of the list of paid VOD platform usage in Germany, and followed by Netflix, Sky Go, Google Play, and Maxdome.⁵ Maxdome is a VOD service platform of ProSiebenSat.1 Media SE. In order to combat the growing proportion of OTT service providers, major players in Germany, like other countries, are actively pursuing alliance strategies. For example, ProSieben Sat.1 Media SE and Discovery Communications announced a plan to build a joint streaming platform to combat Amazon and Netflix.

Germany, as an EU Member State, will also be subject to the new guidelines when the EU AVMSD amendment enters into force. The main points of the amendment to the AVMSD were discussed in detail in the case of France. In addition to the EU AVMSD, Germany has its own regulations on TV broadcasting in the “Interstate Treaty on Broadcasting and Telemedia”. In this treaty, broadcasting is defined as “a service that linearly transmits video and sound through electromagnetic waves in accordance with a programming plan”, and telemedia is defined as “all of the information and telecommunication services which are not broadcasting or purely technical telecommunication”. Therefore, it includes reviewing service and VOD service.⁶

According to the regulation on the online service of the public broadcasters, the public broadcasters can service the contents related to the broadcasting programs only through the online platform. View of public broadcaster program is limited to 7 days, view of large-scale sports content is limited to 24 hours, view of information delivery programs (news and

⁵ Krieger, J. (2017). *Amazon and Netflix lead German pay-VOD market*. Retrieved from <https://www.broadbandtvnews.com/2017/11/30/amazon-and-netflix-lead-german-pay-vod-market/>

⁶ Korea Creative Content Agency (2017). *방송영상 콘텐츠 유통 플랫폼 해외 사례 연구: OTT를 중심으로*.

documentaries) is limited to 12-24 months, and 5 years for educational and cultural programs. Movies, TV dramas or text-based news contents purchased with copyright cannot be broadcasted via online service platform. The reason for limiting the provision period is to minimize the adverse effects on commercial media (private broadcasters, newspapers, publishers, etc.), which are competing in the existing online content market. Public broadcasters are not only receiving subsidies from the government beyond market principles, but they also have a strong credibility in terms of contents, which may harm commercial media that follow market principles.

The German Federal Cartel Office regulates the collusion between broadcasters. In April 2012, ARD and ZDF jointly established the VOD platform “Germany's Gold” in April 2012, but in 2013, the cartel agency did not allow it. Similarly, RTL Interactive and ProSiebenSat. 1 Media jointly planned the VOD platform “Amazonas” in 2012 but was also not allowed. The reason for the office's disapproval is a concern that the price of the service and the sale of the works could be colluded by major broadcasters in the competition when they start to provide online video services together. Instead, the office recommended ARD and ZDF to set up an independent VOD platform separately, but both companies gave up due to the lack of economic feasibility.

Recently, the number of viewers, who use the online video service platform centered on younger ages rather than the traditional TV viewing method, increases, and awareness, that cooperation between the public broadcasting companies could reduce the budget and improve the efficiency of management, has been widespread so that discussions on the amendment of broadcasting regulations are underway. In October 2017, the Conference of Heads of State and Government decided to allow collaboration among public broadcasters and discussed whether to expand online services. Discussions included the abolition of restrictions on the service period of 7 days for public broadcasters, permission to service 30 days for European films and dramas that purchased copyrights, and to service 7 days for broadcasting large sports events. If the discussion continues, it is expected to aforementioned topics could be included in the amendment bill of the broadcasting treaty.

As we have seen in detail in the case of France, the strategies of OTT operators in Germany can be divided into “localization strategy”, “partnership strategy”, “content differentiation strategy”, “revenue enhancement strategy”, and “service optimization

strategy”.

In order to expand the number of subscribers in Germany, localization strategy was harnessed by Amazon Video in 2016. Amazon took a charge on distributing “Paterson”, co-produced film with K5 International in Germany. In 2017, Netflix's German original drama series “Dark” was released, and in the same year, Amazon Video's German original drama series “You are wanted” was released. Global OTT operators in Germany are offering these original German contents to not only Germany but also other overseas markets. The localization strategy is expected to be further strengthened when the AVMSD amendment enters into force.

Alliances among broadcasters are also happening. In 2017, Netflix established a partnership with Unitymedia Horizon, Deutsche Telekom so that Netflix VOD service could be access to their IPTV platforms. In the same year, Rakuten signed an alliance with Samsung Electronics to supply its VOD service to Samsung Smart TVs, which had been sold in Germany. In 2018, a partnership between Netflix and Sky was established to provide Netflix VOD service to Sky Q, a TV platform connected to satellite broadcasting receivers.

German OTT operators are focusing on securing and supplying killer contents and mania contents as part of their content differentiation strategy. Original contents that has been proven to be marketable overseas or Hollywood blockbuster movies are examples of killer contents. To provide mania contents to sports enthusiasts, Amazon Video purchased the rights to broadcast the games of the National Football League in 2017 and succeeded in purchasing the rights to broadcast the UK Premier League football games (2019-2020) by overtaking the existing broadcasters such as NBC, Disney, and Sky in 2018 as a VOD operator.

Netflix launched a relatively low-priced service plan (basic: 7.99 euros per month) in 2014 when it entered the German market in order to increase profits by expanding its subscribers. Amazon users were able to do online shopping and use music, book, TV, movie, and other contents via Amazon Prime (\$ 99 per year), but in 2016, Amazon launched Amazon Prime Video platform supplying TV and movie contents only (minimum \$ 8.99 per month). If we convert the monthly rate to the annual rate, we could see that the total price rose rather than down ($8.99 \times 12 = \$ 107.88$).

For its service optimization strategy, Netflix introduced work curation and

recommendation functions. Amazon Video introduced the ability to download video contents in 2015 and also initiated 4K high-definition streaming service. In 2016, it launched a platform called Amazon Video Direct that allows content creators to upload their own contents.

In addition, existing mainstream operators have similarly used “partnership strategy”, “content differentiation strategy”, “revenue enhancement strategy”, “service optimization strategy”, “envelopment strategy”, and “business diversification strategy”.

Table 3
Strategies of major broadcasting firms in the German market.

	OTT Firms	Major Existing Firms
2014	<ul style="list-style-type: none"> △ Netflix launched a SVOD service in Germany. The basic monthly rate was set at 7.99 euros. △ Rakuten TV entered the German OTT market 	<ul style="list-style-type: none"> △ ProSiebenSat.1’s VOD service Maxdome retained more than 80 US popular dramas. It also introduced content recommendation algorithm. △ ProSiebenSat.1 launched an integrated reviewing service 7TV △ Sky VOD service Sky Snap reduced the monthly rate from 9.99 euros to 3.99 euros. △ RTL group subsidiary Fremantle Media acquired an US TV program producer 495 Productions
2015	<ul style="list-style-type: none"> △ Amazon Video introduced video contents download function △ Amazon Video provided 4K quality streaming service 	<ul style="list-style-type: none"> △ Maxdome partnered with a cable company Unitymedia △ ProSiebenSat.1 acquired a MCN service provider Collective Digital Studios (CDS) △ Deutsche Telekom launched MyKidio app for children's audio book / movie / broadcasting service
2016	<ul style="list-style-type: none"> △ Amazon Video launched Amazon Video Direct which allows content creators to upload their own contents △ Amazon Video introduced video streaming only rate system (minimum \$ 8.99) 	<ul style="list-style-type: none"> △ Deutsch Telekom launched Entertain TV, a next generation IPTV platform combined with TV / VOD / multi-screen functions △ RTL launched an integrated reviewing service TV Now △ ProSiebenSat.1 launched documentary special channel Kabel eins Doku, video streaming service Quazer, video trading platform Glomex

2017	△ Netflix provides service to Unitymedia Horizon's set-top boxes	△ RTL acquired 30% of stake in a data analysis company Q Division
	△ Netflix released the first German original drama series "Dark"	△ RTL launched a free VOD service Watchbox after acquiring a video portal service Clipfish
	△ Amazon Video released the first German original drama series "You are wanted"	△ ProSiebenSat.1 provided 4K picture quality broadcasting service through HbbTV
		△ ProSiebenSat.1 provided a movie / drama viewing service in ICE in Germany via WiFi
2018	△ Amazon Video bought rights to broadcast the UK Premier League soccer matches (2019-2020)	△ ProSieben Sat.1 announced a plan to build a co-streaming platform with Discovery Communications

3. Literature Review

3.1. Emergence and Influence of OTT Firms

The term OTT is the abbreviation of "Over-The-Top", which has a meaning that audiovisual contents are delivered over the top of existing types of TV receivers such as cables, satellite dishes, and set-top boxes (Urgelles, 2017). Synonyms for OTT, "non-linear (or on-demand) audiovisual media service" or "Video-On-Demand" are also used. Audiovisual Media Services Directive from the European Union defines the non-linear audiovisual media service as "audiovisual media service provided by a media service provider for the viewing of programs at the moment chosen by the user and at his individual request on the basis of a catalogue of programs selected by the media service provider".⁷ Meanwhile, ITU defines VOD as "a service in which the end-user can, on demand, select and view a video content and where the end-user can control the temporal order in which the video content is viewed".⁸ Budzinski and Lindstädt (2018) largely divided the types of VOD into "Advertising Financed VOD (AVOD)" and "User Financed VOD (PVOD)". In the AVOD model, customers watch the streaming of videos for free in return for watching

⁷ The European Parliament and the Council of the European Union. (2010). *Directive 2010/13/EU of the European Parliament and of the Council of 10 March 2010*. Retrieved from <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:095:0001:0024:EN:PDF>

⁸ ITU. (2010). *Proposal for revised text of H.IPTV-AM.1 concerning terminology and addition of a configuration examples appendix*. Retrieved from <https://www.itu.int › wftp3 › av-arch › iptv-site › 1012-PNE>

advertisements. YouTube, MSN Movies, and Hulu are employing this model. On the contrary to this, PVOD is a model that users pay fees to VOD services directly in return for watching VOD contents. PVOD could be classified again in detail into transactional video-on-demand (TVOD) and subscription-based video-on-demand (SVOD). The former refers to a model in which customers pay for a service just one-time. Instead, they are required to watch content within a limited time. iTunes store is a representative case. The latter refers to a model in which customers pay a flat rate subscription fee regularly, instead they could access to a VOD platform and watch contents freely within a certain period. Netflix or Amazon Prime Video use this profit model. In this paper, the terms OTT and VOD are assumed to indicate same meaning.

Budzinski and Lindstädt (2018) also remarked three characteristics of OTT distinguished from existing TVs. Firstly, OTT lowers down distribution costs and makes an environment in which minor content creators are possible to reach viewers through online platforms (e.g. YouTube, vlogs) with easier and simpler way of processes and activities. Secondly, OTT makes online content providers could get viewers' feedback in real time (e.g. comments, reviews, ratings, likes, etc.) and they could use those as data for making better services meeting demands. Lastly, OTT facilitates the use of mobile devices for watching contents.

Which factor made the advent of OTT possible? As aforementioned, this paper already diagnosed the reason: "dot-com boom" in 1990s. Herrero (2003) said the distribution of audiovisual contents via the Internet is an ideal way to realize economies of scale and efficient windowing strategies. Hoelck and Ballon (2016) cited "digitization" as the reason. They enunciated digitization gave rise to on-demand services and interactive communications in platforms, and it helped to form direct user interface called the Electronic Program Guide. In addition, they elucidated it took a role of catalyst for making electronic companies and internet companies jump into the broadcasting market. For instance, Apple rolled out Apple TV in 2007, and Google rolled out Google TV in 2010 and Android TV in 2014. Besides those, Netflix and Amazon, as new OTT platforms, successfully made inroad into the existing broadcasting industry at early stages. What were the success factors for it? Doyle (2013) cited "first-mover advantage, bandwagon effects, and lock-in tendencies" as main reasons.

They did not get the success for nothing. OTT firms were thrown in a quite complicated situation known as multi-sided market at early stages. Firms should manage to mediate and

coordinate different interests of multiple stakeholders (Rochet & Tirole, 2006) in the multi-sided market. In the case of LinkedIn, for example, it is facing an environment that it should handle conflicting interests of customers, recruiters, and advertisers. OTT firm cannot avoid trade-off. If an OTT firm wants to attract many subscribers by charging price below marginal cost, it should derive profit on the other side like advertisers. In other words, it needs to subsidize one side for increasing revenues (Evans & Schmalensee, 2007). Since users could skip advertisements easily when using OTT platforms, the proportion of advertisement revenues of pay-TV broadcasters is on a downward trend currently (Hoelck & Ballon, 2016). Therefore, OTT firms are required to take a broad view and be concentrated on balancing conflicted interests among stakeholders. Furthermore, OTT services faced high entry barriers made by incumbents in infancy.

Which factors do act as entry barriers to OTT firms then? Urgelles (2017) mentioned there are two types of entry barriers in the broadcasting industry: traditional barriers and real barriers. The author said “almost zero marginal cost” and the “high fixed cost” could be contained to the former, and the high fixed cost is related to content production, setting up infrastructures, and meeting legal and technical requirements. On the latter, the author stressed firms’ ability to suggest suitable contents to customers and service them in the most efficient way, and anticipated dominant broadcasters in the future would be ones which succeed in crossing the barrier by meeting customers’ demands fast after analysis of data and providing personalized services. Other previous works diagnosed that “network effects” and “switching costs” had been barriers made by incumbents (Farrell and Saloner, 1985; Katz and Shapiro, 1985; Klemperer, 1987). As a solution for crossing those traditional concepts of barriers, “revolutionary functionality” was mentioned (Henderson and Clark, 1990). In this view, platforms are required to address the barrier through performance improvements, leading users’ expectations, and absorbing switching costs (Katz and Shapiro, 1985; Henderson and Clark, 1990; Lieberman and Montgomery, 1998). Budzinski and Lindstädt (2018) brought up “frequency Scarcity” and the “ability to offer a full-range program” as the barriers. However, they mentioned the former barrier has been losing its importance owing to the development of new transmission technologies (satellite, cable, internet, etc.), and they said availability and price of contents are discouragements for achieving the latter.

Besides mentioned barriers, incumbents employ price discrimination and bundling to

weaken OTT firms' invasion (Waterman et al., 2013). Nevertheless, the advent and growth of OTT services have stimulated traditional broadcasters to be more tech-oriented, satisfy users' needs more, and be more efficient, and those lead to put pressure in prices, costs, and investment (Porter, 1998; Urgelles, 2017).

3.2. Responses of Telecom Firms

The telecommunication industry is a typical example of that positive network effects work that the more the network size increases, the more consumers' utility increases as well. The notion "network strength" is also used for measuring telecom firms, and it denotes "the marginal impact of a unit increase in network size on demand" (Eisenmann et al., 2011). In the perspective of the resource-based view, telecom companies' network is the crucial resource which sustains their competitive advantage in the long-term. For OTT firms, telecoms' network is also indispensable resource to deliver contents to subscribers. Thus telecom firms are required to assure "net neutrality".

How have telecoms been doing so far in this close relationship with OTT firms? Liu & Chan-Olmsted (2003) saw telecom firms could apply two options for entering a new business domain. First one is to pursue self-production with their own resources, and the other is to establish partnerships with OTT firms and/or incumbents. The alliance of NBC and Microsoft in 1996, NBC and CNET in 1998, and Netflix and Comcast in 2014 are examples. The former could be related to platform envelopment, and the latter could be related to vertical integration, which is a strong degree of alliance.

Platform envelopment denotes a platform provider's inroad into another market with combined functionality between the provider and the target so as to harness shared customer relationships and common components (Eisenmann et al., 2011). Microsoft used this strategy bundling the Windows Media Player into the Windows Operating System in order to catch up the market share of Real.

The type of integration could be divided into horizontal integration and vertical integration (Shankar & Bayus, 2003). The former indicates M&A between companies at the identical level of production and distribution, and the latter indicates M&A between companies at the different level of production and distribution. Horizontal integration is implemented by

companies which expect the realization of economies of scale and enhancement of market power. Vertical integration is made an attempt to fulfill secure resources and manage product specifications (Lorange, Kotlarchuk, & Singh, 1994). A host of telecom companies have tried this vertical integration with the purpose of block the cord-cutting phenomenon. The case of merger between AT&T and Time Warner and the case of acquisition between NBC-Universal are well-known demonstrations (Strangelove, 2015). In detail, telecoms could benefit from vertical integration because it makes them apply a bundling strategy called “triple play”, a combined service consisting of broadband, voice, and pay-TV (Evens and Donders, 2018).

3.3. Mergers, Acquisitions, and Media Market Concentration

Chon et al. (2003) enunciated that merger is a sort of combination between firms leading to the existence of only one firm after the combination. In this case, the target company disappears after the combination, and the acquiring firm takes on the target’s assets and liabilities. On the contrary, the target firm exists after acquisition. Acquisition denotes that the acquiring company acquires the target’s operating assets by paying cash, securities, or both of them. The notion M&A is distinguished from a consolidation, another type of combination which leads to a whole new joined company, and it assumes all of the assets and liabilities of both of previous firms (Alexander et al., 1993). One of the benefits of consolidation is to give the acquirer and target equal footing in the new entity (Gaughan, 1991). Another similar but broader notion to M&A is the term “convergence”. Previous scholars defined convergence as the phenomenon of technological integration (Danowski & Choi, 1999; Fidler, 1997; Pavlik, 1998) or the disruption of boundaries between economic sectors (Kang & Johansson, 2000). Companies attempt convergence when they are necessary to develop new technologies quickly and to enlarge customer base. Walt Disney’s acquiring Capital Cities/ABC resulted from the Telecommunications Act of 1996 in the U.S. can be seen the case of convergence aiming at those purposes.

Why are many firms eager to M&A then? Do M&A bring about positive consequences all the time as firms’ expectations? Many scholars have already reviewed the effects of M&A. Depamphilis (2001) cited economies of scale and scope, the realignment of strategies, and the

shift of technologies, which all could generate synergies, as the main drivers. Hong et al. (2012) said “expansion of product lineup”, “ecosystem synergy”, “cluster of acquisitions”, and “challenge to the market leader” are motives for M&A. Tseng and Litman (1998) mentioned economies of scale and scope, synergy effects, and market power, which all are beneficial to realize economic efficiencies. Besides economies of scale and scope, Lorange et al. (1994) additionally mentioned strategic resources’ diversification. On top of those, upsides such as to rectify target firms’ agency problems, to save taxes, to wipe out overlapping operations, more efficient use of targets’ assets, financial synergy, etc. have been discussed (Ghosh and Jain, 2000; Hayn, 1989; Healy et al., 1992).

On the other hand, scholars have also pointed out downsides, which could arise from M&A. Jope et al. (2009) identified many cases telling M&A could end up with negative shareholder returns, and Park et al. (2002) identified cases that transaction costs outweigh synergy effects. Sometimes companies’ trials to succeed in M&A even fail due to the variation of stock prices, different corporate cultures, and different characteristics of employees (Whalen and Litman, 1997). To divide M&A into two types (horizontal & vertical integration) allows us to understand more details of M&A.

Tseng and Litman (1998) exemplified US West’s case so that horizontal integration could yield the expansion of customers and business. According to them, US West became to service bundled packages consisting of broadband, telephone, digital video, etc. Furthermore, it is known that horizontal integration between distributors gives rise to a bigger entity, and it could gain bargaining power to lower content prices when negotiating suppliers (Chipty & Snyder, 1999; Crawford & Yurukoglu; 2012).

However, horizontal integration does not always cause upsides. Adilov and Alexander (2006) argued it has a possibility to perturb suppliers’ decision to produce and to act as a gatekeeper, and it could be worse if the large distributor has a monopoly. Meanwhile, Iosifidis (2014) worried about that the advent of a large media company could degrade pluralism and diversity in the media industry so that different or opposite views cannot spread.

Smith (1991) asserted vertical integration is a cheaper way to gain control on information and software than to buy those from rivals. Gershon (2013) saw vertical integration has the right functions to make bilateral contracting more efficient, decrease transaction costs, and protect intellectual properties. Waterman (1993) said vertical integration yields not only

economies of scale and scope but also the provision of information on views' preferences. In addition, it is considered that vertical integration could bring about low transaction costs, program diversity, the acquirement of more subscribers, and price decrease (Ahn and Litman, 1997; Evens, 2014; Ford and Jackson, 1997; Rogerson, 2012; Suzuki, 2006; Waterman and Weiss, 1996). Rey and Tirole (2007) pointed out vertical integration could raise entry barriers or cause price discrimination according to customer groups and geographical markets, and Doganoglu and Wright (2010) set out merged companies in the upstream market could foreclose or disadvantage competitions from access to resources (e.g. affiliated platforms, networks, subscribers, etc.) in the upstream. It has a possibility to damage the right of choice of consumers and pluralism in the broadcasting market. Therefore, Evens and Donders (2016) urged regulatory authorities to create a "level-playing field" so that downsides arising from M&A can be alleviated. Without the effort, they look ahead that large merged firms bearing huge bargaining power could take away a large portion of values from minority firms in a zero-sum game.

As aforementioned, the disruption of entry barriers, which hindered non-media firms from jumping into the broadcasting market, has happened due to the development of ICT and deregulation, and it has led to the change in the market structure. Tseng and Litman (1998) tried to measure the change arising from the merger case of US West and Continental Cablevision. They confirmed that the merger gave rise to a moderately concentrated market in terms of HHI (1,326) but a high concentrated market in terms of CR4 (61.4%) and CR8 (76.3%). They concluded that this merger was attempted in the purpose of diversifying revenue sources, acquiring market power on programs, and drawing out synergy effects resulted from bundling of video, voice, and data services. Meanwhile, the microscopic observation of Ghosh (2004) tells us that the rise of market share after M&A is beneficial to improve profitability, and it is possible because M&A have a positive effect on operating performance and the productivity of asset management.

4. Research Framework and Hypothesis

4.1. OTT Revenues and Market Concentration

As aforementioned, existing pay-TV broadcasters respond to OTT firms' blitz with strategies such as "partnership strategy", "content differentiation strategy", "revenue enhancement strategy", "service optimization strategy", "envelopment strategy", "business diversification strategy", etc. M&A trials of broadcasters can be included in the partnership strategy. According to Chan-Olmsted (1998), the sorts of strategic alliances have a spectrum ranging from a licensing to joint marketing to consortium to joint ventures, and to M&A. Thus we can appreciate M&A as the most extreme case of alliances. In addition, the author identified that the numbers of M&A transactions (TV, cable, and telephone transactions) valued at more than \$5 million in the U.S. in 1996 had been increased year-on-year. Tseng & Litman (1998) enumerated economies of scale and scope, synergy effects, and market power for unearthing firms' motives for M&A, and they also figured out M&A function as a factor destroying entry barriers among different segments. Taking a step forward, they identified the passage of the Telecommunications Act of 1996 in the U.S., which was a great institutional change, catalyzed the increase of CR4, CR8, and HHI in the MSO market by comparing those in 1995 with those in 1996. Likewise, M&A act as a cause triggering off the change of market structure and post-merger effect. Interestingly, Schumpeter (1942) insisted that an increase in market concentration could enable the ecosystem to yield more innovation since that cools down overheated competition, not helpful to encourage firms to result in innovation in line with incentives. Buzzell and Gale (1987) saw large market share is advantageous to achieve higher profitability derived from economies of scale, and Kim and Singal (1993) saw M&A lead to more market power. Eckbo (1992) argued firms could raise market share in the purpose of lowering down industry rivalry. Other scholars also have looked into market concentration indices for measuring the degree of change in the market structure. For example, Albarran and Dimmick (1996) figured out the concentration indices in the whole communication industry were not that high when had examined the market in 1994. Compaine and Gomery (2000) also assured the media market in the U.S. was not highly concentrated when they had compared the concentration in 1986, the year after the Federal Communications Commission (FCC) had lowered the height of barriers hindering ownership of broadcast properties, with the concentration in 1997, the year after the passage of the Telecommunications Act of 1996. Vizcarrondo (2013) also looked into the U.S. market,

and concluded the whole media industry had not been highly concentrated and diversified from 1976 to 2009. The author added the concentration of media industry revealed three kinds of trends: 1) declining concentration (1976-1987), 2) consistent concentration (1988-2000), and 3) increasing concentration (2001-2009). Now that barriers among sub-segments in the whole media industry are being torn down as time goes by, the author insisted to measure the ownership concentration of the media market with a macro view is a more appropriate method than to measure it with a micro view.

This paper argues the revenue growth of OTT service providers triggers off an increase in horizontal integration among pay-TV markets as one of the responding strategies. Tseng and Litman (1998) found out horizontal integration may lead to the expansion of customers and business domain when had looked into US West's merger case, which had made it possible to provide bundled packages combined with broadband, telephone, digital video, etc. On top of that, it has turned out that content distributors, who succeed in M&A could benefit from larger bargaining power to cutback content prices when negotiating suppliers (Chipty & Snyder, 1999; Crawford & Yurukoglu; 2012).

Be based upon aforementioned rationales related to horizontal integration as the partnership strategy and market concentration this paper hypothesizes:

Hypothesis 1: Pay-TV market concentration would be positively associated with OTT service revenues

4.2. Fixed Broadband Subscriptions and Market Concentration

As aforementioned several times, the pervasion of happening of technological convergence in the broadcasting market comes as no surprise now. According to Baldwin et al. (1996), convergence can be defined as the integration of audiovisual contents and distribution channels including telephone, cable, etc. Especially, the passage of the Telecommunications Act of 1996 and the rise of OTT market have facilitated convergence in the broadcasting market. How have telecommunication companies responded to that then? This paper argues those have used the two types of strategies mainly: vertical integration and envelopment strategy. Kulkarni et al. (2014) pointed out low average revenue per user (ARPU) was one of

the reasons for making telecoms attempt integration. They judged low ARPU had been arisen from price competition and regulations, and M&A could be a breakthrough, which results in high stock price, low interest rates for paying back debts, and better underwriting condition, for reversing the situation. Besides, sometimes telecommunication companies employ platform envelopment strategy by launching brand new affiliations taking on OTT service similar to that of Netflix or Amazon Video. As aforementioned, for example, a French telecom Orange initiated SVOD service in 2014, and Orange's OTT service OCS Go signed exclusive supply contracts with Warner Bros, HBO, MGM, and Fidelity in 2017. Another French mobile operator Numericable-SFR purchased the right to broadcast UK Premier League soccer games in 2015. In 2015, meantime, Deutsche Telekom launched MyKidio application for children's audio book, movie, and broadcasting service, and it also launched Entertain TV, a next generation IPTV platform combined with TV, VOD, and multi-screen functions in 2016.

Notwithstanding these telecom companies' efforts renewed efforts, OTT services have achieved more successes by capitalizing on the Internet service of telcos (Scaglione et al., 2015). Fixed broadband is a key means to supply the service, and it has been an indispensable resource to OTT services. It has enabled the transactions of commercial contents (e.g. online news, music, and movies) and user-created contents (e.g. individual writings in SNS and/or blog, photos, and video clips) in OTT service platforms. Those platforms could be considered to be in a two-sided market in that those function as an intermediary linking content suppliers and consumers like credit card services and dating services (Rysman, 2009). Rysman (2009) argued pricing and openness are factors for platform services to consider first as strategies. According to his assistance, platforms services should take two sides' elasticity of demand and the marginal cost into account in order to set the price-cost mark-up simultaneously. Openness denotes the number of sides platform services have to consider and the degree of compatibility toward other platform competitions.

Why is fixed broadband one of the crucial resources to OTT firms? It is because it has network externalities (or network effects) raising values derived from service transactions. According to Katz and Shapiro (1985, 1986), network externalities could be classified into direct network externalities and indirect network externalities. The former indicates the more the size of user bases increases, the more the value arising from transactions increases as well.

The latter is related to complementary goods and indicates the more the number of complementary goods or services increases, the more the value arising from transactions increases. In detail, network externalities could have a positive impact on companies' competitive advantage (Afuah, 2013). A competitive advantage denotes a high rate of profitability which is higher than that of average in the markets (Grant, 2005; Besanko et al., 2010). Classical views on network effects have focused on the size of network generally and reckoned the aggregate utilities in a network is proportional to the $N(N-1)$ connections made by N members in a network. Afuah (2013), however, insisted that the size is not the only matter but a network's structure (feasibility of transactions, members' centrality, structural holes, network ties, and members' roles) and conduct (opportunistic behaviors, members' reputation and trust) also should be considered for measuring network effects more precisely.

This paper postulates the increase of fixed broadband subscriptions sets up a favorable environment in which OTT services could expand its influence more, and it triggers off and facilitates the high concentration of pay-TV market since pay-TV broadcasters may perceive the expansion as a threat and consider M&A as one of countermeasures to keep OTT firms at bay. Based upon the rationales related to network effects of fixed broadband for OTT services, this paper hypothesizes:

Hypothesis 2: Pay-TV market concentration would be positively associated with fixed broadband subscriptions

4.3. OTT Revenues and Cord-Cutting

Cord-Cutting denotes "the process of switching from traditional cable, IPTV, or a satellite video subscription to video services accessed through a broadband connection, so called over-the-top (OTT) video" (Alleman et al., 2013). Siegfried and Evans (1994) elucidated two main reasons why firms enter the market: high past profit rates and market growth. They insisted firms are eager to enter the market when the market is growing fast and becomes more profitable, but firms are reluctant to enter when the costs of capital for setting up a minimum efficient scales plant. Entry is attempted in a way that firms initiate to roll out unprecedentedly new products, or introduce existing products in new geographic areas. In

terms of main agents, in addition, entry could be tried by incumbents' diversification and/or new startups. A determinant in entering to the market is to weigh the net present value of expected revenues and that of expected costs including post-entry operating costs. However, firms may not enter the market showing declining profitability even though revealed present profits are high, and firms would think about likely counteractions from competitions (Geroski et al., 1990). Previous scholars who looked into U.S. and Korean industries (e.g., Chappell, Kimenyi, and Mayer (1990), and Jeong and Masson (1991)) also found out that high profitability functions as an enticing incentive for entry.

Another influential and explanatory factor for entry is the market growth. Although revealed present profits are low, new entrants would jump into the market readily when their expectation of the growth potential of future demand outweighs that of incumbents. In the growing market, new entrants expect high profits since they judge that the market price would not go down even if they increase productions in the case demand exceeds supply enough. However, entrants could be reluctant to enter when the fierce counteractions of incumbents are anticipated.

If so, what could be expected after entrants enter the market? It is known that entry makes firms agile to adapt to the change in demand, technology, and factor prices. It is also known entry makes the market more competitive (Schwalbach, 1990), and makes incumbents more efficiently manage. Entry could be carried out by incumbents selling existing products in other geographic markets, or incumbents selling different products in the identical geographic market, or new entrants. It has a tendency that the entry of firms with new production facilities instead of existing ones is more beneficial to fast grow and survive because new facilities for exclusive use have low opportunity costs. According to Porter (2008), entry is made up of two stages: 1) SMEs' inroad into a niche with generics, and 2) inroad into the main industry with trademarks. Incumbents make attempts to head off new entrants capitalizing on structural barriers, absolute cost barriers, economies of scale, multi-plant management, behavioral barriers, limit pricing, excess capacity, etc.

This paper takes notice of the market growth acting as an enticing incentive to give rise to the entry of firms. It assumes VOD revenues on an upward trend have other incumbents (e.g. telecommunication services and pay-TV broadcasters) and new entrants (e.g. new OTT services) enter the OTT market, and highly increased competition in the OTT market owing

to the entry may raise OTT firms' ability to meet varying consumers' demand quickly by adopting cutting-edge technology and adjusting factor prices. This may have OTT firms do business in a more efficient way, and it may lead to depressed market price of OTT services, better customized services (e.g. Netflix's content recommendation service using A.I.), activated audiovisual content transactions, and so on. Therefore, it is anticipated that the growth of OTT market and the development of OTT services would intensify the cord-cutting phenomenon and decrease the number of household subscriptions to existing pay-TV services (cable, satellite, and IPTV). Based upon the rationales related to the positive relationship between the market growth and the entry of firms resulting in the general development of OTT services ultimately, this paper hypothesizes:

Hypothesis 3: Pay-TV take-up would be negatively associated with VOD service revenues

4.4. Fixed Broadband Subscriptions and Cord-Cutting

Some of the previous papers tried to figure out how telecommunication firms take action against the expansion of OTT firms and what kind of relationship telecoms want to establish. Limbach (2014) focused on cooperative behaviors between telecoms and OTT services. Picot et al. (2003) defined cooperation as collaboration of economically separate entities in the medium and long term. The authors classified the cooperation into seven types: promotion, bundling, special OTT data tariffs, local service consultant, access to customer data, access to core services, and technology integration. Here promotion indicates to enhance consumers' awareness for the benefits could derive from combined services, and bundling implies combined service packages for low price. Special OTT data tariffs indicate different pricing for OTT data-usage, local service consultant indicates to accommodate OTT services into telecoms' service portfolio, and access to customer data implies sharing of customers' data. Access to core services denotes offering the infrastructure of telecoms to OTT alliances, and technology integration means the integration of technological resources. Those kinds of cooperation enable telecoms to ameliorate their existing services without new investments on resources, and to enhance service quality and supply customized services. This paper assumes the cooperative behaviors between telecoms and OTT services raise opportunities that users

are exposed to OTT services and experience it more. Thus cord-cutting could be facilitated.

Of course, fixed broadband networks are also indispensable resources not only to telecoms but also to OTT services so that it could be used cooperatively. On the contrary, the networks could be capitalized on in favor of affiliations of telecoms supplying OTT services only by setting up barriers to dedicated OTT firms. In this case, network neutrality problem could arise. In addition, Baldry et al. (2014) argued cognition that OTT firms are free riders is partially wrong because telecoms are paid from customers who pay a flat rate.

Previous works unearthed that cord-cutting arises from network infrastructure, subscription fee, and OTT service quality, and that younger generations and low-income users are prone to become cord-cutters (Baccarne et al., 2013; Banerjee et al., 2013). Meanwhile, Ganuza and Vicens (2014) pointed out telecoms capitalize on two strategies for addressing OTT firms' expansion: bundling services and launching their own OTT services. Taken altogether, this paper postulates the increase of fixed broadband subscriptions results in larger network externalities which yield more values. This may induce more new OTT entrants to enter the market. Some of the telecoms would enter with their own OTT service as well. These would make the OTT market more competitive and, it may lead to depressed market price of OTT services, better customized services, activated audiovisual content transactions. Therefore, those may facilitate cord-cutting, especially that of young and low-income customers. Based upon the rationales related to network effects of fixed broadband for OTT services, this paper hypothesizes:

Hypothesis 4: Pay-TV take-up would be negatively associated with fixed broadband subscriptions

5. Research Methodology and Data

Unlike previous literatures measured post-merger effects in the media industry (e.g. Albarran and Dimmick, 1996; Chan-Olmsted, 1998; Compaine and Gomery, 2000; Evens and Donders, 2016; Noam, 2016; Tseng and Litman, 1998; Vizcarrondo, 2013; Winseck, 2018), this paper attempts to not only acquire the country-level panel data, which are consecutive

market concentration ranges from 2009 to 2016 in the nine countries but also conduct a quantitative analysis. In addition, this paper endeavors to how the growth of VOD revenue and the network effects of fixed broadband subscriptions affect the “cord-cutting” phenomenon through an econometrical analysis.

Now that the main source of TV revenues source, makes up the largest portion of total TV revenues, and the main platform type of pay-TV broadcaster, accounts for the largest portion of subscribers, had been set as dummy variables, it ran R program and applied the least square dummy variable analysis in order to get econometric results and to see the relationship between the two independent variables and two dependent variables lagged by one year.

5.1. Independent Variable

OTT service revenues and fixed broadband subscriptions are used for independent variables to measure the degree of the development of the OTT market and to estimate that of infrastructure which is an indispensable resource for delivering OTT service and enjoying benefit from network effects. Here OTT service revenues imply the total sum of TVOD (Transactional Video on Demand) revenues and SVOD (Subscription Video on Demand) revenues earned from supplying services via broadband or wireless Internet connection on PC, TV, or other devices. This variable is set to measure the growth of the OTT market in terms of quantitative volume and money amount. Fixed broadband subscriptions denote “fixed subscriptions to high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s”.⁹ This variable is set to measure the network effects of fixed broadband, which is an indispensable resource to OTT firms. It is a new type of means for OTT firms to transmit audiovisual contents, thus the more user bases of fixed broadband, the more OTT entrants may be apt to enter the OTT market.

The data period spans from 2009 to 2016, and nine countries are gone over for conducting a country-level analysis (Canada, China, France, Germany, Italy, Japan, South Korea, the UK,

⁹ THE WORLD BANK. (2019). International Telecommunication Union, World Telecommunication/ICT Development Report and database. Retrieved from <https://data.worldbank.org/indicator/IT.NET.BBND?view=chart>

and the US). For selecting target countries, this paper considered the size of TV revenues above all. The nine countries ranked within top 12 in 2016 according to Ofcom International Communications Market Report 2017 except Canada. Although Canada had been dropped in the report, but it was also examined in order to add one more nation in North America besides the US, and due to relatively ease to collect data. The balance of continents to which they belong also considered: 3 Asian countries, 4 European countries, and 2 American countries. The characteristic of the broadcasting market of each country was also considered. As aforementioned already, digital terrestrial and satellite platforms are dominant in UK and Italy, while IPTV and cable platforms are dominant in France and Korea. In Germany, US, and Japan, cable and satellite platforms are dominant. Additionally, the growth of US broadcasting market has been driven by private pay-TV companies mainly, while that of UK, Italy, and China has been driven by public terrestrial broadcasters mainly. Meanwhile, public paid broadcasting has largely contributed to that of Germany, Japan, France, and Korea.

OTT service revenue data on seven countries (China, France, Germany, Japan, Korea, UK, and US) have been collected from PWC's "Global Entertainment and Media Outlook (2013-2017)", and the data on Italy have come from HIS Markit. The data on Canada have come from "Canadian Media Concentration Research Project (CMCRP) Workbook 2016". In the case of Canada, the data in 2009 and 2010 were marked as 0 based upon the source and an article explaining Canada's OTT market just started to form when Netflix entered Canadian market in 2010.¹⁰

For gathering telecom service revenue data on seven countries, Ofcom International Communications Market Reports published from 2010 to 2017 were referred. The data on Canada came from CMCRP Workbook 2016, and the data on Korea came from Korea Association for ICT Promotion's "Information & Communication Technology Survey 2017".

5.2. *Dependent Variable*

Tseng & Litman (1998) enunciated the passage of the Telecommunications Act facilitated the increase of CR4, CR8, and HHI in the MSO market by comparing those in 1995 with

¹⁰ Sylvain, M. (2013). *Canadian OTT market to be worth \$614 million by 2017: PWC*. Retrieved from <http://playbackonline.ca/2013/06/05/canadian-ott-market-to-be-worth-614-million-by-2017-pwc/>

those in 1996. They employed those indices as to measure the change of market structure and post-merger effect. Other scholars also have looked into those indices for measuring post-merger effects. For example, Albarran and Dimmick (1996) judged that the market concentration of communication industry as of 1994 was not that high, Compaine and Gomery (2000) concluded that of media market in the US was not that high as well. Meanwhile, Winseck (2013) found out the Canadian pay and specialty TV market concentration is on an upward trend in terms of HHI and CR together.

HHI is made of the sum total of squares of all market shares in a certain market (Pavic et al., 2016).

$$HHI = \sum_{i=1}^n S_i^2$$

Here S_i^2 indicates squared market share of the i-th firm in the market. Thus HHI index has spectrum ranging from around 0 to 10,000. The former figure implies the market is in perfect or monopolistic competition, and the latter figure implies the market is in pure monopoly. U.S. Department of Justice postulates the market is not concentrated when HHI is lower than 1500, moderately concentrated when HHI is between 1500 and 2500, and highly concentrated when HHI is over than 2500.¹¹ Since HHI considers all firms' market share, in general, HHI is regarded as a better method to measure market concentration than CR. Vizcarrondo (2013) added HHI shows individual firms' impact on the whole market structure. However, Pavic et al. (2016) insisted they could not find difference between CR and HHI when looking into the US economy. They argued it would lead to a same result regardless whether we adopt CR or HHI because there is a positive relationship between CR and HHI.

Following previous works' logic, this paper measures post-merger effects with pay-TV market HHI calculated from the number of subscribers of major broadcasting firms in the nine countries. The HHI of pay-TV market of Korea and Canada was gained from “방송시장 경쟁상황 평가” written by Korea Information Society Development Institute from 2015 to

¹¹ U.S. Department of Justice and the Federal Trade Commission. (2010). *Horizontal Merger Guidelines*. Retrieved from <https://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf>

2017 and “CMCRP Workbook 2016” respectively. In the case of Canada, 2009 data was replaced by 2008 data inevitably due to the lack of 2009 data. The US data were gathered from “Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming 14th - 18th Report” written by the Federal Communications Commission and research of Leichtman Research Group (2017). For getting Chinese and German data, SNL Kagan Database (2010-2017) was referred to calculate HHI. In the case of China, major pay-TV broadcasters such as China Telecom, JSBC, Shandong Broadcast & TV, Sichuan Cable, Wasu Group, Guangdong Broadcast & TV, Hebei Radio & TV, Hubei Radio & TV, Fujian Broadcast & TV, etc. were taken into account to derive the dependent variable with an assumption that those major broadcasters account for almost the whole pay-TV market share. It was unavoidable choice due to the difficulty of obtain recent and consecutive HHI regarding the whole pay-TV market. The data derived from this way of calculation may not represent the market concentration 100% precisely but it would be useful to examine and estimate the direction of change of market structure. On Germany, the numbers of subscribers to major pay-TV broadcasters like Sky Deutschland, Vodafone Kabel Deutschland, Unitymedia / KabelBW, HD+, Deutsche Telekom, Tele Columbus were considered. In the case of the data of UK and Japan, Ovum’s articles were useful to derive the index. For obtaining the HHI in UK, BSkyB, Virgin Media, BT, and TalkTalk were targeted, and J:Com, JSAT, NTT Plala, Wowow, NTT East, etc. were targeted for the Japanese data. French data were collected from articles of Ovum and Informa, and from Vivendi Group’s Annual Report (2013-2016), and Italian data were collected from several news articles. In the case of France, France Telecom (Orange), Canal+, Free, and Numericable-SFR were examined, and, Italian case, Sky Italia, Fastweb, and Tivu were examined.

Pay-TV take-up denotes “the number of TV households that pay for a DTT, satellite, cable or IPTV subscription service” in this paper.¹² This variable is set to measure the fluctuation of user base of pay-TV so that it is possible to estimate the cord-cutting phenomenon.

5.3. Control Variable

¹² Ofcom (2017). *International Communications Market Report 2017* (Figure 46). Retrieved from https://www.ofcom.org.uk/__data/assets/pdf_file/0032/108896/icmr-2017.pdf

GDP per capita in current prices was used to control causes which may affect the size of VOD revenues, fixed broadband subscriptions, and pay-TV subscriptions in the nine countries. All of the data related to the countries came from IMF Datasets.

This paper analyzed which revenue source (subscriptions, public funding, and advertising) makes up the largest portion of total TV revenues in targeted countries as of 2016 for classifying those countries in line with the main source and employing the main source of TV revenues as a dummy variable. HIS market data, which were applied and used in Ofcom's International Communications Market Reports, were referred to analyze the dummy variable. In this case, advertising was set as a reference dummy variable.

On top of that, this paper also examined what the platform type of pay-TV broadcaster (cable, satellite, and IPTV) accounts for the largest portion of subscribers among targeted pay-TV broadcasters in each country as of 2016 for classifying those countries in line with the platform type and employing the main type of pay-TV platform as a dummy variable. For setting and using the dummy variable, data on the number of subscribers of targeted pay-TV broadcasters, which were analyzed and applied in advance for calculating HHI in this paper, were referred. In this case, cable was set as a reference dummy variable.

Year dummy variables were also applied for controlling year effects.

When it was needed to convert currency (e.g., UK pound, euro, won, etc.), for some data, exchange rate at the end of the year shown was used.

Table 4
Data sources.

Variable	Country	Source
VOD Service Revenue	CHN, FRA, GER, JAP, KOR, UK, US	PWC. Global Entertainment and Media Outlook: 2013-2017.
	CAN	Canadian Media Concentration Research Project Workbook 2016
	ITA	HIS Markit
GDP per Capita, Current Prices	CAN, CHN, FRA, GER, ITA, JAP, KOR, UK, US	IMF Datasets. World Economic Outlook (April 2019).
Fixed Broadband Subscriptions	CAN, CHN, FRA, GER, ITA, JAP, KOR, UK, US	The World Bank Data

Pay-TV Market Concentration / Main Pay-TV Platform	CHN, GER	SNL Kagan Database 2010-2017
	FRA	Informa (2013). Western Europe TV: Country fact sheets to end-3Q12. Ovum. Western Europe, Pay TV & FTA Forecasts to 2018-2021. Vivendi Group Annual Report 2013-2016
	JAP	Ovum (2017). Japan TV Update. Ovum. Asia Pacific, Pay TV & FTA Forecasts to 2015-2021.
	UK	Ovum (2016). UK TV Update. Ovum. Western Europe, Pay TV & FTA Forecasts to 2014-2019.
	CAN	CMCRP Workbook 2016
	ITA	News Articles
	KOR	Korea Information Society Development Institute. 『방송시장 경쟁 상황 평가』 2015-2017
Pay-TV Take-UP	US	Federal Communications Commission. Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming 14 th - 18 th Report Leichtman Research Group (2017). Major Pay-TV Providers Lost About 795,000 Subscribers in 2016.
	CHN, FRA, GER, ITA, JAP, UK, US	Ofcom. International Communications Market Report 2010-2017
	CAN	Communications Monitoring Report 2018-2014
	KOR	KISDI. 『방송매체 이용행태 조사』 2010-2017
Main Source of TV Revenue	CAN, CHN, FRA, GER, ITA, JAP, KOR, UK, US	Ofcom. International Communications Market Report 2010-2017

6. Results

According to the results, it has turned out postulated an independent variable, OTT service revenues, which is the total sum of SVOD and TVOD revenues, is not a statistically significant factor that affecting the one year lagged pay-TV market structure nor cord-cutting phenomenon. In other words, the sum of OTT revenue amounts does not have meaningful “catfish effect” on making existing pay-TV broadcasters be concentrated more arisen from brisk M&A activities nor on the decrease in the pay-tv take-up. Conversely, however, the result shows the VOD service revenues would increase pay-TV take-up when the squared

independent variable (fixed broadband subscriptions) is included for the regression test. These results run counter to the hypothesis 1 and 3, and may be explained that, as OTT service revenues go up, existing pay-TV broadcasters desperately strive to head off the decrease in subscriptions and get subscribers back again by cutting price back and supplying more services, even though those could incur losses in the short-term. Those incumbents' efforts may lead to the increase of pay-TV take-up.

On the contrary, it has been ascertained that fixed broadband subscriptions affect both of the pay-TV market concentration and pay-TV take-up significantly. It has also clarified that the network effects of fixed broadband have a significant catfish effect on the structural change of the pay-TV market and cord-cutting. Fixed broadband is a key means to supply the service, and it has been an indispensable resource for OTT services to trade commercial contents and user-created contents. The more fixed broadband subscriptions increase, the more OTT services could benefit from increased values and high rate of profits. This bigger network effects may sets up a favorable environment in which OTT services could expand its influence more, and it would trigger off and facilitate the high concentration of pay-TV market since pay-TV broadcasters may perceive the expansion as a threat and consider M&A as one of countermeasures to keep OTT firms at bay. The larger network effects arisen from the increase of fixed broadband may induce more new OTT entrants to enter the market. Some of the telecoms would enter with their own OTT service as well. It seems that these entries would make the OTT market more competitive and, it may lead to depressed market price of OTT services, better customized services, and brisk audiovisual content transactions for meeting varying consumers' demands quickly in a more efficient way. Therefore, increasing network effects may facilitate cord-cutting.

Table 5
Correlation matrix between variables.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) OTT service revenues	1						
(2) Fixed broadband subscriptions	0.2614	1					
(3) GDP per capita	0.4116	-0.5424	1				
(4) Public funding	-0.1463	-0.1208	0.1805	1			

(5)	Subscriptions	0.3329	0.3900	-0.3137	-0.3952	1	
(6)	IPTV	-0.2373	0.3449	-0.6712	-0.2500	0.6324	1
(7)	Satellite	-0.2360	-0.3228	0.1526	0.5000	-0.3162	-0.5000
							1

Table 6

Results of VIF test when the dependent variable is pay-TV market concentration.

Variable	VIF
OTT service revenues	1.9470
Fixed broadband subscriptions	1.8078
GDP per capita	2.3021
Factor (main source of TV revenue)	1.5895
Factor (main pay-TV platform)	1.7566
Factor (year)	1.0165

Table 7

Results of VIF test when the dependent variable is pay-TV take-up.

Variable	VIF
OTT service revenues	1.9104
Fixed broadband subscriptions	1.7126
GDP per capita	2.2398
Factor (main source of TV revenue)	1.5725
Factor (main pay-TV platform)	1.7344
Factor (year)	1.0147

Table 8

Results of regression test.

	Pay-TV market concentration		Pay-TV take-up	
OTT service revenues	4.2843e-02 (4.9464e-02)		-1.5715e-03 (8.5882e-04)	.
Fixed broadband subscriptions	7.3625e+00 (1.7845e+00)	***	-1.0140e-01 (2.9363e-02)	**
GDP per capita	6.5755e-02 (8.9104e-03)	***	-1.8752e-04 (1.7123e-04)	
Factor (main source of TV revenues) public funding	-4.5903e+03 (2.4488e+02)	***	3.3645e+01 (4.7569e+00)	***
Factor (main source of TV revenues) subscriptions	-1.8479e+03 (2.3919e+02)	***	2.9912e+01 (4.6079e+00)	***

Factor (main pay-TV platform) IPTV	2.7250e+03 (3.2682e+02)	***	-3.0497e+01 (6.2640e+00)	***
Factor (main pay-TV platform) satellite	4.8821e+03 (2.1614e+02)	***	-4.8107e+01 (4.1544e+00)	***
Factor (year) 2010-2016	Included		Included	
Intercept	-3.4727e+02 (4.3192e+02)		7.9407e+01 (8.2236e+00)	***
N	72		72	
Adjusted R-Squared	0.9359		0.7551	
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1; Figures in parenthesis '()' refer to Std. Error				

Table 9
Results when including the squared independent variable.

	Pay-TV market concentration		Pay-TV take-up	
OTT service revenues	-3.137e-02 (5.491e-02)		1.761e-03 (6.680e-04)	*
Fixed broadband subscriptions	2.072e+01 (5.432e+00)	***	-6.530e-01 (6.436e-02)	***
I((Fixed broadband subscriptions)^2)	-4.977e-02 (1.923e-02)	*	1.724e-03 (1.923e-04)	***
GDP per capita	7.761e-02 (9.599e-03)	***	-8.501e-04 (1.331e-04)	***
Factor (main source of TV revenues) public funding	-4.858e+03 (2.539e+02)	***	4.678e+01 (3.406e+00)	***
Factor (main source of TV revenues) subscriptions	-1.975e+03 (2.317e+02)	***	3.642e+01 (3.066e+00)	***
Factor (main pay-TV platform) IPTV	2.986e+03 (3.254e+02)	***	-4.382e+01 (4.313e+00)	***
Factor (main pay-TV platform) satellite	5.095e+03 (2.205e+02)	***	-5.862e+01 (2.930e+00)	***
Factor (year) 2010-2016	Included		Included	
Intercept	-1.134e+03 (5.095e+02)	*	1.190e+02 (6.908e+00)	***
N	72		72	
Adjusted R-Squared	0.9425		0.8977	
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1; Figures in parenthesis '()' refer to Std. Error				

When the squared independent variable “fixed broadband subscriptions” is included to the regression test, however, the relationship between fixed broadband subscriptions and market concentration shows an inverted U-shape in two dimensions, while the relationship between fixed broadband subscriptions and pay-TV take-up shows a U-shape. These results indicate there are opposite effects after a certain point. Those curves may appear due to excessive competition and the saturation of OTT market. Siegfried and Evans (1994) enumerated firms’ motives to exit: low profits, a long-term decrease in demand, and displacement by more efficient entrants. The market saturation may yield low profitability for firms, and it would trigger off exits of OTT services at the certain point. This lowers the competition and efficiency in the OTT market, and it would be less threatening to pay-TV incumbents so that the market concentration could go down later. In addition, the lowered competition and efficiency may lead to the increase of price so that users could choose pay-TV services again as substitutes for OTT services. If so, pay-TV take-up could soar again later.

In conclusion, it turns out the hypothesis 2 and 4 are supported by the LSDV results, but the hypothesis 1 and 3 are not.

7. Conclusion

As a result of analyzing the cases of major broadcasting countries, this paper found that OTT operators' common strategies are localization strategy, partnership strategy, content differentiation strategy, revenue enhancement strategy, and service optimization strategy.

Existing broadcasters against OTT services are also using the same strategies. Some of the existing broadcasters have used envelopment strategy launching similar services to OTTs, and diversification strategy by acquiring data analysis companies or launching content producing affiliation.

This paper produces results that the sum of OTT revenue amounts does not have meaningful influence on the structural change of the pay-TV market nor the cord-cutting phenomenon. Meanwhile, the result shows the OTT service revenues would increase pay-TV take-up when the squared independent variable (fixed broadband subscriptions) is considered.

This paper also drives results the network effects of fixed broadband have a significant

catfish effect on the structural change of the pay-TV market and cord-cutting. When the squared independent variable “fixed broadband subscriptions” is included to the regression test, however, the relationship between fixed broadband subscriptions and market concentration shows an inverted U-shape in two dimensions, while the relationship between fixed broadband subscriptions and pay-TV take-up shows a U-shape. These results indicate there are opposite effects after a certain point.

This paper made an attempt to conduct a case study on just confined a few countries: US, UK, France, and Germany, taking the lion’s share of total TV revenues. Although it was possible to check what kinds of meaningful strategies firms are using, but it seems it would be required to further research on other huge and rising broadcasting markets (e.g. India, Brazil, Russia, etc.) to increase universality. In addition, future research is needed to include more target countries to understand how OTT revenues and fixed broadband subscriptions affect the change in broadcasting market structure more precisely. It just confined the breadth of the dependent variables to pay-TV market (cable, satellite, and IPTV). Since it was a hard job for an individual researcher to investigate and collect the country-level dependent variables, I narrowed down the coverage of whole firms in the pay-TV market to several major companies with an assumption those largest a few companies occupy almost whole market share when calculating HHI on six (Germany, France, Japan, Italy, China, and UK) out of nine countries. Although this method allowed to derive needed consecutive year data and to measure the direction of variation of market structure, but future research is required to more precise data representing the whole market of each country to measure more accurate degree of post-merger effect. Furthermore, it would be more fruitful when examining detail broadband factors, which have network effects on OTT services, such as 4G and 5G. Mobile broadband subscriptions were not analyzed as another independent variable in this paper because it had showed a high correlation with fixed broadband subscriptions.

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